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 CENTRAL INTELLIGENCE AGENCY REPORT
 INFORMATION FROM
 FOREIGN DOCUMENTS OR RADIO BROADCASTS CD NO.

COUNTRY USSR
 SUBJECT Scientific - Electricity, electric machines
 HOW PUBLISHED Monthly periodical
 WHERE PUBLISHED Moscow
 DATE PUBLISHED Apr 1950
 LANGUAGE Russian

DATE OF INFORMATION 1949

DATE DIST. 24 Sep 1951

NO. OF PAGES 3

SUPPLEMENT TO REPORT NO.

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SOURCE Elektrichestvo, No 4, 1950, p 91.

DISCUSSION IN VNITOE OF BOOKS ON ELECTRIC MACHINES

Ye. Ya. Kazovskiy, chairman
 Electric Machines Section
 VNITOE

At the end of 1949, in Leningrad, two books were discussed in the Electric Machines Section of VNITOE (All-Union Scientific and Technical Society of Power Engineers): Electric Machines, Special Part by Prof M. P. Kostenko, Doctor of Technical Sciences, and Design of Electric Machines by Prof A. Ye. Alekseyev.

Kostenko explained how his book had been compiled, the principles guiding its exposition, and indicated the procedure used for setting forth the principal problems. He remarked that it reflected his views on many problems. In the special part of the course, the author's views are quite evident; however, the main problems connected with modern theory of the electric machine have also been given consideration.

Prof L. N. Gruzov, Doctor of Technical Sciences, read a report on Kostenko's book. The following took part in the discussion: A. Ya. Berger, I. M. Postnikov, Ye. A. Pal', and Ye. Ya. Kazovskiy.

Berger said that the publication of Kostenko's book is a major event in the history of literature on electric machines. The book contains many original ideas, concepts, and methods, and is distinguished by the special presentation of the material and the use of a great many sources. Criticisms offered by Berger were: up-to-date treatment of some problems is lacking, e.g., switching problems; the operator method calls for the use of Laplace transforms instead of Carson transforms; the signs of the equations for a short-circuited transformer in the first and second parts of the book do not agree.

Postnikov, while agreeing with the over-all high evaluation given to Kostenko's book by Gruzov, noted some defects. The author had set himself the task of covering in one book a very large amount of modern knowledge, not only

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of machines, but also in many complex allied fields (rectifiers, wave processes in transformers, etc.), he said. Some sections of the book were so short that they were not sufficiently convincing, he thought. Nonetheless, Postnikov felt that the defects were mainly stylistic and editorial.

Pal' remarked that Kostenko created a unified leakage theory and combined many problems which were previously discussed only in separate articles. He noted that considerable attention was given to the part played by Soviet scientists and electrical engineers in the development of electric machines.

Kazovskiy then read a resolution of the Bureau of the Electric Machines Section of VNITOE giving a high evaluation to Kostenko's book. In Kazovskiy's opinion, the book contained isolated inaccuracies where the operator method was used. For example, he said, equation (1559) was not strictly correct when the speed of rotation varies but there is no reservation to the effect that the speed of rotation is constant.

Before A. Ye. Alekseyev's book was discussed, its author also explained how it was written. He pointed out that it was the result of his many years of work in the design of electric machines. The size of the book was originally 60 octavos. To comply with a request of the publisher, it had to be cut to 46 octavos, and therefore some subsections, particularly problems concerning the procedure used in designing electric machines, and most of the numerical examples were eliminated.

B. N. Krasovskiy, Candidate in Technical Sciences read a report on Alekseyev's book. He stated that it contains material (sufficiently complete for students in higher technical educational institutions) on types of electric machine designs, on the interrelation of the design principles of electric machine construction with problems involved in the electrical calculation of machines, of heating, and of ventilation, and on various production methods, etc. He felt that the division of the material into 14 chapters was quite appropriate from the methodological viewpoint. The book gave a clear account of the part played by Soviet engineers in taking the initiative in large electric machine building, he said. Krasovskiy emphasized that "in view of the practical examples and simplicity of exposition, it can be confidently stated that Alekseyev's book will be an excellent textbook for production innovators and operational personnel wherever electric machines are used." At the same time, Krasovskiy noted that insufficient attention was given to splashproof electric machines, water cooling of electric machines, air-coolers and cooling electric machines by oil circulation, and also to dynamic balancing of rotors of electric machines in their own bearings. In addition, he said, the author failed to examine problems connected with economic and weight relationships in electric machines; these problems are becoming especially important at present not only for large standardized series of machines, but also for small series of specialized machines whose design is based on special requirements, e.g., minimum over-all weight or maximum possible efficiency.

A. Ya. Berger, I. M. Postnikov, M. P. Kostenko and Ye. Ya. Kazovskiy took part in the ensuing discussion.

Berger considered the publication of a book on the design of electric machines of great importance to our higher educational institutions. In noting isolated defects in the book, he pointed out that it made no mention of gas coolers and packings of hydrogen-cooled machines. Omission of a chapter on optimum weight ratios and calculation procedure served no good purpose, he said. A more thorough theoretical basis should have been given for the heat calculations, and transitional heat conditions should have been examined in more detail, he felt.

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Postnikov, who evaluated Alekseyev's book highly, remarked that it was the first attempt at a serious generalization of present-day thinking on design of electric machines. He praised the method used in the book for ventilation design, although he thought the exposition of this section was incomplete, i.e., ventilation losses in machines were not examined, fan selection was not discussed, and there was no information on the necessary air speeds in machines. The major defect of the book, according to Postnikov, was the lack of a treatment of economic problems.

Kostenko thought the book combined profound design knowledge with thorough understanding of the theory of electric machines. He considered this combination its most important merit.

Kazovskiy made the following remarks, after stressing the fact that the book was intended for an exceptionally large body of readers:

The clarity and lucidity of exposition and the ease with which this or that topic can be found in Alekseyev's book are on a very high level. On the other hand, the topics are not covered with uniform thoroughness. There are not enough tables in the book, and some tables have no references to the corresponding standards. In the chapter on materials, much space has been allocated to metals but practically nothing was given on insulating materials. From a methodological point of view, it is difficult to understand why the book sets forth the principles of heat design while including no up-to-date data on mechanical design, fatigue and plastic properties of metals, etc.

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